Elenco pubblicazioni selezionate:

1. A. Palermo, A. Sodo, A.M. Naciu, **M. Di Gioacchino**, A. Paolucci, A. di Masi, D. Maggi, P. Crucitti, F. Longo, E. Perrella, C. Taffon, M. Verri, M.A. Ricci, A. Crescenzi "Clinical use of Raman spectroscopy improves diagnostic accuracy for indeterminate thyroid nodules", The Journal of Clinical Endocrinology and Metabolism, ***2022***, 107(12), 3309, doi: 10.1210/clinem/dgac537.

2. E. Fardelli, M. Lucidi, **M. Di Gioacchino**, S. Bashiri, L. Persichetti, G. Capecchi, T. Gasperi, A. Sodo, P. Visca, G. Capellini "Bio-physical mechanisms of dehydrating membranes of Acinetobacter baumannii linked to drought-resistance", Biochimica et Biophysica Acta - Biomembranes ***2022***, 1864(12), 184045, doi: 10.1016/j.bbamem.2022.184045.

3. A. di Masi, R.L. Sessa, Y. Cerrato, G. Pastore, B. Guantario, R. Ambra, **M. Di Gioacchino**, A. Sodo, M. Verri, P. Crucitti, F. Longo, A.M. Naciu, A. Palermo, C. Taffon, F. Acconcia, F. Bianchi, P. Ascenzi, M.A. Ricci, A. Crescenzi "Unraveling the Effects of Carotenoids Accumulation in Human Papillary Thyroid Carcinoma", Antioxidants, ***2022***, 11(8), 1463, doi: 10.3390/antiox11081463.

4. A. Sodo, M. Verri, A. Palermo, A.M. Naciu, M. Sponziello, C. Durante, **M. Di Gioacchino**, A. Paolucci, A. di Masi, F. Longo, P. Crucitti, C. Taffon, M.A. Ricci, A. Crescenzi "Raman Spectroscopy Discloses Altered Molecular Profile in Thyroid Adenomas", Diagnostics, ***2021***, 11, 43, doi: 10.3390/diagnostics11010043.

5. **M. Di Gioacchino**, F. Bruni, M.A. Ricci "Aqueous solution of betaine: Hydration and aggregation", Journal of Molecular Liquids, ***2020***, 318, 114253, doi: 10.1016/j.molliq.2020.114253.

6. M. Sbroscia, **M. Di Gioacchino**, P. Ascenzi, P.Crucitti, A. di Masi, I.Giovannoni, F. Longo, D. Mariotti, A.M. Naciu, A. Palermo, C. Taffon, M. Verri, A. Sodo, A. Crescenzi, M.A. Ricci "Thyroid cancer diagnosis by Raman spectroscopy", Scientific Reports, ***2020***, 10, 13342, doi: 10.1038/s41598-020-70165-0.

7. **M. Di Gioacchino**, F. Bruni, S. Imberti, M.A. Ricci "Hydration of Carboxyl Groups: A Route toward Molecular Recognition?", The Journal of Physical Chemistry B, 2020, 124 (21), 4358-4364, doi: 10.1021/acs.jpcb.0c03609.

8. **M. Di Gioacchino**, A. Bianconi, M. Burghammer, G.Ciasca, F. Bruni, G.Campi "Myelin Basic Protein dynamics from out-of-equilibrium functional state to degraded state in myelin", BBA-Biomembranes, ***2020***, 1862, 183256, doi: 10.1016/j.bbamem.2020.183256 .

9. **M. Di Gioacchino**, M.A. Ricci, S. Imberti, N. Holzmann, F. Bruni, "Hydration and aggregation of a simple amino acid: The case of glycine", Journal of Molecular Liquids, ***2020***, 301, 112407, doi: 10.1016/j.molliq.2019.112407.

10. **M. Di Gioacchino**, F. Bruni, M.A. Ricci "N-Methylacetamide aqueous solution: a neutron diffraction study", The Journal of Physical Chemistry B, 2019, 123 (8), 1808-1814, doi: 10.1021/acs.jpcb.9b00246.

11. **M. Di Gioacchino**, F. Bruni, M.A. Ricci "Protection against Dehydration: a Neutron Diffraction Study on Aqueous Solutions of a Model Peptide and Trehalose", The Journal of Physical Chemistry B, 2018, 122 (45), 10291-10295, doi: 10.1021/acs.jpcb.8b08046.

12. G. Campi, **M. Di Gioacchino**, N. Poccia, A. Ricci, M. Burghammer, G. Ciasca, A. Bianconi, "Nanoscale Correlated Disorder in Out-of-Equilibrium Myelin Ultrastructure", ACS Nano 2018, 12, 729−739, doi: 10.1021/acsnano.7b07897.

Tesi dottorato:

PhD's degree in Scienze della materia, nanotecnologie e sistemi complessi;
Thesis Title: "A study about biopreservation: bioprotectants hydration and their protection activity."

Data: 27-01-2023

ELENCO PUBBLICAZIONI

1. E. Talamas Simola, M. Montanari, C. Corley-Wiciak, L. Di Gaspare, L. Persichetti, M. H. Zöllner, M. A. Schubert, T. Venanzi, M. Cagnon Trouche, M. Ortolani, F. Mattioli, G. Sfuncia, G. Nicotra, G. Capellini, M. Virgilio, and M. De Seta, "Subnanometer control of the heteroepitaxial growth of multimicrometer-thick Ge/(Si,Ge) quantum cascade structures," Phys. Rev. Appl. 19, 014011 (2023).

2. S. Rossi, E. Talamas Simola, M. Raimondo, M. Acciarri, J. Pedrini, A. Balocchi, X. Marie, G. Isella, and F. Pezzoli, "Optical manipulation of the Rashba effect in germanium quantum wells," Adv. Optical Mater. 10, 2201082 (2022).

3. E. Talamas Simola, V. Kiyek, A. Ballabio, V. Schlykow, J. Frigerio, C. Zucchetti, A. De Iacovo, L. Colace, Y. Yamamoto, G. Capellini, D. Grützmacher, D. Buca, and G. Isella, "CMOS-compatible bias-tunable dual-band detector based on GeSn/Ge/Si coupled photodiodes," ACS Photonics 8, 2166–2173 (2021).

4. E. Talamas Simola, "Voltage-tunable dual-band Ge/GeSn photodetector," PhD thesis, (2021).

5. J. M. Ramirez, Q. Liu, V. Vakarin, X. Le Roux, J. Frigerio, A. Ballabio, C. Alonso-Ramos, E. Talamas Simola, L. Vivien, G. Isella, and D. Marris-Morini, “Broadband integrated racetrack ring resonator for long-wave infrared photonics,” Opt. Lett. 44, 407-410 (2019).

6. E. Talamas Simola, A. de Iacovo, J. Frigerio, A. Ballabio, A. Fabbri, G. Isella, and L. Colace, "VIS-NIR GeSi Photodetector with Voltage Tunable Spectral Response," PhotonIcs & Electromagnetics Research Symposium - PIERS-Spring 2019, 3038-3043 (2019).

7. Q. Liu, J. M. Ramírez, V. Vakarin, X. Le Roux, J. Frigerio, A. Ballabio, M. Montesinos, C. Alonso-Ramos, E. Talamas Simola, L. Vivien, G. Isella, and D. Marris-Morini, "On-chip integrated resonators for long-wave infrared photonics," European Conference on Integrated Optics (ECIO) 2019, (2019).

8. E. Talamas Simola, A. De Iacovo, J. Frigerio, A. Ballabio, A. Fabbri, G. Isella, and L. Colace , “Voltage-tunable dual-band Ge/Si photodetector operating in VIS and NIR spectral range,” Opt. Express 27, 8529-8539 (2019).

9. Q. Liu, J. M. Ramirez, V. Vakarin, X. Le Roux, J. Frigerio, A. Ballabio, E. Talamas Simola, C. Alonso-Ramos, D. Benedikovic, D. Bouville, L. Vivien, G. Isella, and D. Marris-Morini , “On chip Bragg grating waveguides and Fabry-Perot resonators for long-wave infrared operation up to 8.4 μm,” Opt. Express 26, 34366-34372 (2018).

10. Q. Liu, J. M. Ramirez, V. Vakarin, X. Le Roux, C. Alonso-Ramos, J. Frigerio, A. Ballabio, E. Talamas Simola, D. Bouville, L. Vivien, G. Isella, and D. Marris-Morini , “Integrated broadband dual-polarization Ge-rich SiGe mid-infrared Fourier-transform spectrometer,” Opt. Lett. 43, 5021-5024 (2018).

11. Q. Liu, J. M. Ramírez, V. Vakarin, X. Le Roux, C. Alonso-Ramos, J. Frigerio, A. Ballabio, E. Talamas Simola, D. Bouville, L. Vivien, G. Isella, and D. Marris-Morini, "Integrated broadband mid-infrared polarization insensitive Fourier-Transform spectrometer," 2018 Asia Communications and Photonics Conference (ACP), 1-3 (2018).

PERSONAL INFORMATION

Michael Di Gioacchino

I am a Postdoctoral researcher in experimental Biophysics at the Dipartimento di Scienze, Università degli Studi Roma Tre at the Liquids and SpectraLab Groups. My research is focused on three main topics:

1. Hydration of protectants (trehalose, betaine, etc.) and biomolecules (peptide, etc.) and their interaction in order to investigate the bioprotection mechanism of the former.
2. Structural characterization of biological membrane, such as myelin or bacteria membrane, aimed at studying the phase transition between a functional state and an early stage of degradation.
3. Cancer spectroscopic features, in particular on thyroid tissue and colorectal samples, in order to better understand the cancer characteristics, such as tumorigenesis, and to improve and make the diagnosis more reliable, also by the design and optimization of dedicated Raman instrumentation for in-vivo mesurements.

To investigate these topics, I have used several analytical techniques, such as Raman and dielectric spectroscopy, in our laboratory and facility (IHP), and diffraction ones, using both neutron and X-ray beam, in large scale facilities (ISIS, ESRF). In addition, I have analyzed data applying statistical analysis, multivariate statistical analysis and machine learning tools.
I have had experience in various research groups in Italy and Europe developing a strong attitude to teamwork.

RESEARCH ACTIVITY

Dec. 2021– Nov.2022

Research grant on FOR_ECO project, Università degli Studi Roma Tre.
FOR_ECO project is a project financed by the Regione Lazio, based on the collaboration among Roma TRE, Sapienza University and a private partner “Helio”. Aim of this project is to characterize the performances of the solar oven and optimize the cooking processes obtained by direct irradiation. In particular, I have focused my attention on the optimization of the solar oven thermal characteristics. Therefore, I have performed several tests with solar oven in order to enhance its performances, choosing a phase changing material, that works as thermal storage, and a UV filter in order to avoid degradation of the nutrients during the cooking.
I go on with the collaboration in TIRAMA project, reported below. In this context, I am performing Raman measurements on cytological and just extracted organs in order to develop, design and optimize a Raman probe instrumentation dedicated to in-vivo thyroids measurements. For the data analysis, I am using multivariate statistics and machine learning techniques.
In addition, I investigated colorectal extracellular vesicles, in collaboration with the Catholic University of Sacred Heart. Aim of this study is the characterization of Raman markers to differentiate the tumor state during cancer treatments by multivariate statistical analysis.
Furthermore, I have been involved in a multicompetences department project, regarding the study and characterization of Baumanni bacteria, with special attention on membrane phase transition, from liquid to gel state, during both dehydration process and temperature variation, exploiting Raman spectroscopy both at standard condition and at low-high temperature, using the linkam sample holder. In this context, using similar condition of Baumanni membrane, recently I started to investigate the biomimicking membranes of lung, characterizing the effect of composition on the physicochemical properties, in particular, observing the liquid-gel membrane transition during temperature change (condition of body alterated temperature).
Finally, I deepen my PhD project, aimed at understanding the bioprotective mechanism of carbohydrates, by performing neutron diffraction experiments and dielectric spectroscopy measurements at low temperature (120-300 K) in order to investigate the phase transitions in ternary trehalose solution.

Dec. 2020– Nov.2021

Research grant on TIRAMA project, Università degli Studi Roma Tre.
TIRAMA project, a national project financed by the Minister of Public Health, is based on the

collaboration between Dipartimento di Scienze and Biomedical Campus of Rome. Aim of this project is the early and more reliable diagnosis of thyroid cancer by Raman spectroscopy. In this context, I am performing Raman measurements on histological tissues and cytological samples in order to differentiate tumoral and healthy samples, and to identify specific molecular fingerprints to study tumorigenesis pathway. For the data analysis, I am using multivariate statistical and machine learning techniques, exploiting mainly non-supervised (K-means, hierarchical clustering and principal component analysis) methods. In addition, I also participate to the design and optimization of Raman instrumentation dedicated to in-vivo measurements.

Nov. 2017– Apr.2021

PhD in Material Science, Nanotechnologies and Complex Systems, Università degli Studi Roma Tre.

My research project was focused on hydration of bioprotective molecules and their protection activity, exploiting neutron diffraction and Raman spectroscopy experiments. On one hand, I investigated the relation between bioprotectants and water solvent, demonstrating how this interaction is fundamental for their function. On the other hand, I tried to investigate the way in which bioprotectants carry out their function. During my PhD I have carried out several neutron diffraction experiments at ISIS, analyzing the data by a Monte Carlo simulation (EPSR code).
In addition, during the third PhD year, I started to be involved in the TIRAMA project, reported above.

Mar. 2016- Sett. 2017

Visiting period\Training internship, *Crystallography Institute*, Consiglio Nazionale della Ricerche (CNR-IC).

During my visiting period at CNR-IC I worked with the group of Dr. Gaetano Campi. In particular, I investigate the myelin basic protein by small angle X-ray scattering (SAXS) at ESRF. Moreover, I developed the code algorithms for X-ray diffraction and SAXS data analysis of myelin to understand the dynamics of the ultrastructure of myelin membrane. The experimental data were obtained from small angle X-ray scattering and X-ray diffraction.

Mar. 2016- Sett. 2017

Research activity fellowship, *Rome International Center for Materials Science*.

My research was focused on the follow-up of the study carried out during my master degree about the myelin and the dynamics of its ultrastructure, under the supervision of Prof. Antonio Bianconi.

EDUCATION

Nov. 2017– Apr.2021

PhD in Material Science, Nanotechnologies and Complex Systems, Università degli Studi Roma Tre.

Final grade: excellent cum laude. Thesis Title: A study about biopreservation: bioprotectants hydration and their protection activity.
I have performed my PhD project in the Liquids Group of Rome Tre University, supervised by Prof. Fabio Bruni and Prof. Maria Antonietta Ricci.

Sett. 2014 - Jen.2017

Master's degree in physics, *The University of Rome*, "La Sapienza".

With a specialization in Physics of Biosystems. Final grade: 110/110 cum laude. Thesis Title: La struttura dinamica della mielina con radiazione di sincrotrone. In my Master thesis I studied the dynamics of myelin ultrastructure performing some experiments at ESRF synchrotron radiation, under the supervision of Prof. Antonio Bianconi, Dr. Gaetano Campi and Prof. Andrea Giansanti. In particular, with the Scanning micro X-ray diffraction, we have shown the presence of correlated disorder in the ultrastructure of myelin in a physiological state, while we have highlighted that this feature is lost as soon as the myelin ages or is denatured.

Sett. 2010 – Jul. 2014 **Bachelor's degree in physics**, *The University of Rome*, "La Sapienza".
Final grade: 101/110. Thesis Title: Studio del fenomeno della rigenerazione dei mesoni K neutri. For my bachelor's thesis I studied the decays of the neutral K mesons, under the supervision of Prof. Antonio Di Domenico.

2005 - 2010 **High School**, Liceo 'Augusto Righi', Rome, high school leaving qualification in scientific studies, final grade 82/100.

TEACHING EXPERIENCE

Mar. 2018-Nov 2018 **Teaching Assistant of Physics course for Geology (Prof. M. A. Ricci)**.
Roma Tre University

Nov. 2019-Feb. 2020 **Teaching Assistant of Physics course for Optics and Optometry (Prof. A. Ruocco)**.
Roma Tre University

LIST OF PUBLICATIONS

Total peer reviewed publications: 17
h-index: 6 **h-index: 7**
Citation: 101, 100 (Web of Science, Scopus) **Citation: 126 (Google Scholar)**
Submitted waiting for review: 1

1. E. Fardelli, M. Lucidi, **M. Di Gioacchino**, S. Bashiri, L. Persichetti, G. Capecchi, T. Gasperi, A. Sodo, P. Visca, G. Capellini "Bio-physical mechanisms of dehydrating membranes of Acinetobacter baumannii linked to drought-resistance", Biochimica et Biophysica Acta - Biomembranes ***2022***, 1864(12), 184045, doi: 10.1016/j.bbamem.2022.184045.

2. A. Palermo, A. Sodo, A.M. Naciu, **M. Di Gioacchino**, A. Paolucci, A. di Masi, D. Maggi, P. Crucitti, F. Longo, E. Perrella, C. Taffon, M. Verri, M.A. Ricci, A. Crescenzi "Clinical use of Raman spectroscopy improves diagnostic accuracy for indeterminate thyroid nodules", The Journal of Clinical Endocrinology and Metabolism, ***2022***, 107(12), 3309, doi: 10.1210/clinem/dgac537.

3. A. di Masi, R.L. Sessa, Y. Cerrato, G. Pastore, B. Guantario, R. Ambra, **M. Di Gioacchino**, A. Sodo, M. Verri, P. Crucitti, F. Longo, A.M. Naciu, A. Palermo, C. Taffon, F. Acconcia, F. Bianchi, P. Ascenzi, M.A. Ricci, A. Crescenzi "Unraveling the Effects of Carotenoids Accumulation in Human Papillary Thyroid Carcinoma", Antioxidants, ***2022***, 11(8), 1463, doi: 10.3390/antiox11081463.

4. **M. Di Gioacchino**, F.Bruni , O.L.G. Alderman, M.A. Ricci "Interaction of trehalose and glucose with a peptide β-turn in aqueous solution", Journal of Molecular Liquids, ***2022***, 349, 118451, doi: 10.1016/j.molliq.2022.118451.

5. **M. Di Gioacchino**, F.Bruni , M.A. Ricci "GPG-NH2 solutions: A model system for β-turns formation. Possible role of trehalose against drought", Journal of Molecular Liquids, ***2021***, 335, 116514, doi: 10.1016/j.molliq.2021.116514.

6. A. Sodo, M. Verri, A. Palermo A.M. Naciu, M. Sponziello, C. Durate, **M. Di Gioacchino**, A. Paolucci, A. di Masi, F. Longo, P. Crucitti, C. Taffon, M.A. Ricci, A. Crescenzi "Raman Spectroscopy Discloses Altered Molecular Profile in Thyroid Adenomas", Diagnostics, ***2021***, 11, 43, doi: 10.3390/diagnostics11010043.

7. **M. Di Gioacchino**, F. Bruni, M.A. Ricci "Hydration of two artificial sweetners: Possible relevance for their taste", Journal of Molecular Liquids, ***2020***, 320, 114398, doi: 10.1016/j.molliq.2020.114398.

8. **M. Di Gioacchino**, F. Bruni, M.A. Ricci "Aqueous solution of betaine: Hydration and aggregation", Journal of Molecular Liquids, ***2020***, 318, 114253, doi: 10.1016/j.molliq.2020.114253.

9. M. Sbroscia, **M. Di Gioacchino**, P. Ascenzi, P.Crucitti, A. di Masi, I.Giovannoni, F. Longo, D. Mariotti, A.M. Naciu, A. Palermo, C. Taffon, M. Verri, A. Sodo, A. Crescenzi, M.A. Ricci "Thyroid cancer diagnosis by Raman spectroscopy", Scientific Reports, ***2020***, 10, 13342, doi: 10.1038/s41598-020-70165-0.

10. **M. Di Gioacchino**, F. Bruni, S. Imberti, M.A. Ricci "Hydration of Carboxyl Groups: A Route toward Molecular Recognition?", The Journal of Physical Chemistry B, 2020, 124 (21), 4358-4364, doi: 10.1021/acs.jpcb.0c03609.

11. **M. Di Gioacchino**, A. Bianconi, M. Burghammer, G.Ciasca, F. Bruni, G.Campi "Myelin Basic Protein dynamics from out-of-equilibrium functional state to degraded state in myelin", Biochimica et Biophysica Acta - Biomembranes, ***2020***, 1862, 183256, doi: 10.1016/j.bbamem.2020.183256.

12. **M. Di Gioacchino**, M.A. Ricci, S. Imberti, N. Holzmann, F. Bruni, "Hydration and aggregation of a simple amino acid: The case of glycine", Journal of Molecular Liquids, ***2020***, 301, 112407, doi: 10.1016/j.molliq.2019.112407.

13. **M. Di Gioacchino**, F. Bruni, A. Sodo, S. Imberti, M.A. Ricci "Ectoine hydration, aggregation and influence on water structure", Molecular Physics, ***2019***, 117 (22), 3311-3319, doi: 10.1080/00268976.2019.1649484.

14. **M. Di Gioacchino**, F. Bruni, M.A. Ricci "N-Methylacetamide aqueous solution: a neutron diffraction study", The Journal of Physical Chemistry B, ***2019***, 123 (8), 1808-1814, doi: 10.1021/acs.jpcb.9b00246.

15. **M. Di Gioacchino**, F. Bruni, M.A. Ricci "Protection against Dehydration: a Neutron Diffraction Study on Aqueous Solutions of a Model Peptide and Trehalose", The Journal of Physical Chemistry B, ***2018***, 122 (45), 10291-10295, doi: 10.1021/acs.jpcb.8b08046.

16. G. Campi, **M. Di Gioacchino**, N. Poccia, A. Ricci, M. Burghammer, G. Ciasca, A. Bianconi, "Nanoscale Correlated Disorder in Out-of-Equilibrium Myelin Ultrastructure", ACS Nano ***2018***, 12, 729−739, doi:10.1021/acsnano.7b07897.

17. **M. Di Gioacchino**, G. Campi, N. Poccia, A. Bianconi, "Correlated disorder in myelinated axons orientational geometry and structure", *Condensed Matter*, ***2017***, *2*(3), 29; doi:10.3390/condmat2030029.

Submitted:

18. M. Di Gioacchino, M. Verri, A.M. Naciu, A. Paolucci, A. di Masi, C. Taffon, A. Sodo, A. Palermo, A. Crescenzi, M.A. Ricci "Probing oxidative stress in cytological thyroid samples by Raman spectroscopy", submitted to Spctrochimica Acta part A: molecular and biomolecular spectroscopy.

CONFERENCES TALKS

14 - 16 September 2022 **XXXII Annual SISN Conference 2021**, *Milan*, Italy
Oral contribution: "Carbohydrates role in bioprotection: their interaction with model polypeptides in aqueous solution"

28 May - 2 June 2022 **WaterX@2022 International Workshop,** *Maddalena*, Italy
Oral contribution: "Carbohydrates interaction with a β-turn peptide in aqueous solution"

7 - 8 October 2021 **XXXII Annual SISN Conference 2021**, *Online*
Oral contribution: "Two is better than one"

24 - 26 June 2019 **XXX Italian Neutron Scattering Conference 2019**, *Rome*, Italy
Invited contribution: "Hydration and Aggregation of Glycine in Aqueous Solution"

15 – 16 May 2019 **Biophysics@Rome 2019**, *Rome*, Italy
Oral contribution: "Meso- and Nano-scale Myelin Correlated Disorder and Its Loss"

4 - 6 July 2019 **XXIX Italian Neutron Scattering Conference 2018**, *Parma*, Italy
Oral contribution: "Trehalose Protectant Activity for peptide hydration"

22 January 2018 **Correlated disorder in biological and complex matter workshop**, *RICMASS*, Rome, Italy
Oral contribution: "Correlated Disorder in Out-of-Equilibrium Myelin Ultrastructure at Nanoscale and Mesoscale"

4 January 2018 **Quantum Complex Matter QCM workshop**, *RICMASS*, Rome, Italy
Oral contribution: "Levy Distribution in Active Matter Out-of-Equilibrium"

OTHER CONFERENCES AND SCHOOLS ATTENDED

28 May - 2 June 2022 **WaterX@2022 International Workshop,** *Maddalena*, Italy
Poster session: "Molecular Recognition through Hydration"

27 - 31 January 2020 **XXIV School of Pure and Applied Biophysics, "Applications of X-rays and Neutron Scattering in Biology",** *Venice*, Italy

12 - 14 June 2019 **Water under extreme conditions**, *Rome*, Italy
Poster session: "Protection of Trehalose Against Dehydration for Model Peptide"

15 -16 May 2019 **Biophysics@Rome 2019**, *Rome*, Italy

Poster session and Flash presentation: "Protection Against Dehydration: the Case of Trehalose and a Model Peptide"

18 - 22 June 2018 **SISN Advanced School 2018, "Neutron scattering data handling, numerical methods, statistical and computational tools",** *San Giovanni (BZ)*, Italy

3 - 8 June 2018 **WaterX: exotic properties of water under extreme conditions**, *Maddalena*, Italy
Poster session and Flash presentation: "Trehalose as a bioprotectant of peptides: A neutron diffraction study"

4-10 July 2017 **SUPERSTRIPES 2017**, Ischia, Italy
Poster session: "Levy flight distribution of fluctuation supramolecular structure of myelin"

AWARDS

Year 2022 **Bando Fare Ricerca:** Awards for researchers and research fellows to strengthen their professional status and strengthen the Lazio research system (annuity 2022).

June 2017 **EPL (EuroPhysics Letter) PRIZE:** for the best poster presentation at the SUPERSTRIPES 2017- Quantum Physics in Complex matter: Superconductivity, Magnetism and Ferroelectricity, International Conference, Ischia, Italia 4 – 10 Giugno 2017.

COMMUNITY SKILLS

Feb. 2019 – June 2020 **Representative of PhD students:** in science of matter, nanotechnologies and complex systems

CERTIFIED SKILLS

Oct.2019-Feb.2020 **Intensive Academic English**: B2+ level

Nov.2019-Dec.2019 **Python Basic:** basic course of python PythonBasic@Roma Tre

May 2020-June 2020 **Python:** intermediate course of python Python@Roma Tre 2020 (training for a machine learning project)

COMPUTER SKILLS

Programs GUDrun, EPSR, Wire, Labspec, Igor, Origin, Kaleidagraph, Microsoft Office

Languages C-language, Matlab, Python, LaTEX

Systems Linux, Macintosh, Windows

LANGUAGES

europass

WORK EXPERIENCE

01/07/2021 – CURRENT Rome, Italy
POSTDOCTORAL RESEARCHER UNIVERSITÀ DEGLI STUDI ROMA TRE

11/2019 – 07/2020 Juelich, Germany
VISITING PH.D STUDENT PGI-9, FORSCHUNGSZENTRUM JUELICH

03/2019 – 07/2019 Milano, Italy
TUTORING FOR 'FUNDAMENTALS OF EXPERIMENTAL PHYSICS' POLITECNICO DI MILANO

EDUCATION AND TRAINING

01/11/2017 – 05/05/2021
DOTTORATO DI RICERCA IN FISICA (PH.D. IN PHYSICS) Politecnico di Milano

Field of study Epitaxy of group IV heterostructures on Silicon, material characterization by AFM, FTIR spectroscopy and XRD, microfabrication and electical/optical characterization of semiconductor devices, design and simulation of infrared detectors targeting NIR and SWIR

Final grade awarded cum laude | **Level in EQF** EQF level 8 |

Thesis Voltage-tunable dual-band Ge/GeSn photodetector

13/05/2019 – 17/05/2019
IDEA LEAGUE DOCTORAL SCHOOL OF ADVANCED ATOMIC SCALE CHARACTERIZATION Chalmers University of Technology

25/03/2019 – 29/03/2019
IDEA LEAGUE DOCTORAL SCHOOL OF ADVANCED ATOMIC SCALE CHARACTERIZATION ETH - Zurich

24/09/2018 – 28/09/2018
IDEA LEAGUE DOCTORAL SCHOOL OF ADVANCED ATOMIC SCALE CHARACTERIZATION RWTH - Aachen

16/10/2017 – 18/10/2017
SCHOOL ON ADVANCED QUANTUM DETECTORS (SQUAD 2017) Fondazione Bruno Kessler

10/2015 – 10/2017
MASTER DEGREE IN ENGINEERING PHYSICS Politecnico di Milano

Field of study Theoretical modeling of the quantum confined Stark effect (QCSE) in Ge/SiGe quantum wells, design of electro-optical modulators exploiting QCSE, microfabrication and electrical/optical characterization of semiconductor devices

Final grade 110/110 cum laude | **Level in EQF** EQF level 7 |

Thesis Germanium quantum wells for electro-optic modulation

10/2012 – 09/2015

BACHELOR DEGREE IN ENGINEERING PHYSICS Politecnico di Milano

Final grade 107/110 | **Level in EQF** EQF level 6 | **Thesis** Caratterizzazione di film monolitici per AEgIS

LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	C1	C1	C1
SPANISH	A2	A2	A1	A1	A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

C (intermediate) | Matlab (intermediate) | Python (advanced) | Julia (basic) | FORTRAN (advanced)

ADDITIONAL INFORMATION

PUBLICATIONS

E. Talamas Simola, M. Montanari, C. Corley-Wiciak, L. Di Gaspare, L. Persichetti, M. H. Zöllner, M. A. Schubert, T. Venanzi, M. Cagnon Trouche, M. Ortolani, F. Mattioli, G. Sfuncia, G. Nicotra, G. Capellini, M. Virgilio, and M. De Seta, "Subnanometer control of the heteroepitaxial growth of multimicrometer-thick Ge/(Si,Ge) quantum cascade structures," Phys. Rev. Appl. 19, 014011 (2023).

S. Rossi, E. Talamas Simola, M. Raimondo, M. Acciarri, J. Pedrini, A. Balocchi, X. Marie, G. Isella, and F. Pezzoli, "Optical manipulation of the Rashba effect in germanium quantum wells," Adv. Optical Mater. 10, 2201082 (2022).

E. Talamas Simola, V. Kiyek, A. Ballabio, V. Schlykow, J. Frigerio, C. Zucchetti, A. De Iacovo, L. Colace, Y. Yamamoto, G. Capellini, D. Grützmacher, D. Buca, and G. Isella, "CMOS-compatible bias-tunable dual-band detector based on GeSn/Ge/Si coupled photodiodes," ACS Photonics 8, 2166–2173 (2021).

J. M. Ramirez, Q. Liu, V. Vakarin, X. Le Roux, J. Frigerio, A. Ballabio, C. Alonso-Ramos, E. Talamas Simola, L. Vivien, G. Isella, and D. Marris-Morini, "Broadband integrated racetrack ring resonator for long-wave infrared photonics," Opt. Lett. 44, 407-410 (2019).

E. Talamas Simola, A. de Iacovo, J. Frigerio, A. Ballabio, A. Fabbri, G. Isella, and L. Colace, "VIS-NIR GeSi Photodetector with Voltage Tunable Spectral Response," PhotonIcs & Electromagnetics Research Symposium - PIERS-Spring 2019, 3038-3043 (2019).

Q. Liu, J. M. Ramírez, V. Vakarin, X. Le Roux, J. Frigerio, A. Ballabio, M. Montesinos, C. Alonso-Ramos, E. Talamas Simola, L. Vivien, G. Isella, and D. Marris-Morini, "On-chip integrated resonators for long-wave infrared photonics," European Conference on Integrated Optics (ECIO) 2019, (2019).

E. Talamas Simola, A. De Iacovo, J. Frigerio, A. Ballabio, A. Fabbri, G. Isella, and L. Colace , "Voltage-tunable dual-band Ge/Si photodetector operating in VIS and NIR spectral range," Opt. Express 27, 8529-8539 (2019).

Q. Liu, J. M. Ramirez, V. Vakarin, X. Le Roux, C. Alonso-Ramos, J. Frigerio, A. Ballabio, E. Talamas Simola, D. Bouville, L. Vivien, G. Isella, and D. Marris-Morini , "Integrated broadband dual-polarization Ge-rich SiGe mid-infrared Fourier-transform spectrometer," Opt. Lett. 43, 5021-5024 (2018).

Q. Liu, J. M. Ramirez, V. Vakarin, X. Le Roux, J. Frigerio, A. Ballabio, E. Talamas Simola, C. Alonso-Ramos, D. Benedikovic, D. Bouville, L. Vivien, G. Isella, and D. Marris-Morini , "On chip Bragg grating waveguides and Fabry-Perot resonators for long-wave infrared operation up to 8.4 μm," Opt. Express 26, 34366-34372 (2018).

Q. Liu, J. M. Ramírez, V. Vakarin, X. Le Roux, C. Alonso-Ramos, J. Frigerio, A. Ballabio, E. Talamas Simola, D. Bouville, L. Vivien, G. Isella, and D. Marris-Morini, "Integrated broadband mid-infrared polarization insensitive Fourier-Transform spectrometer," 2018 Asia Communications and Photonics Conference (ACP), 1-3 (2018).

CONFERENCES AND SEMINARS

23/08/2022 – 28/08/2022 – Zürich, Switzerland
IQCLSW 2022 poster presentation

17/06/2019 – 20/06/2019 – Rome, Italy
PIERS 2019 (41st) oral presentation

18/06/2018 – 22/06/2018 – Strasbourg, France
E-MRS Spring 2018 oral presentation

27/05/2018 – 01/06/2018 – Potsdam, Germany
ICSI/ISTDM 2018 poster presentation

25/09/2017 – 28/09/2017 – Como, Italy
SemiconNano 2017 attendance

PROJECTS

2021 – CURRENT
TERALASER - Emettitore laser nel THz a base di silicio POR FESR 2014-2020, project n. A0375-2020-36579
Participant

2019 – 2021
HYPERMAT - Sviluppo di materiali avanzati per sensore iperspettrale Fondazione Cariplo, Grant No. 2018-1754
Participant

2017 – 2020
SiGe DBIS - Sviluppo di un dispositivo integrato per la rivelazione di immagini operante nel visibile e nel vicino infrarosso P.N.R.M. N° a2013.102
Participant

2017
TEINVEIN - A development platform for a fully autonomous vehicle POR FESR 2014-2020 (ID: 242092)
Participant

MANAGEMENT AND LEADERSHIP SKILLS

Co-supervising a PhD student 10/2022 - present

Co-supervised three bachelor's thesis students 2018-2020